

[54] KINESCOPE TUBE SOCKET WITH COMPONENT RECEIVING MEANS

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[58] Field of Search **317/99, 101 D, 112, 317/118; 338/48, 219, 220, 252, 260, 318-320; 339/147 R, 193**

[56] References Cited

UNITED STATES PATENTS

3,062,991 11/1962 Kaidan 339/193 VS
3,514,745 5/1970 DeLyon 339/193 N

3,423,720 1/1969 Pittman 339/193 R
3,603,914 9/1971 Manetti 339/193 R
2,646,489 7/1953 McArron 338/220
2,726,304 12/1955 Gribble 338/219
3,175,179 3/1965 Trump 317/112

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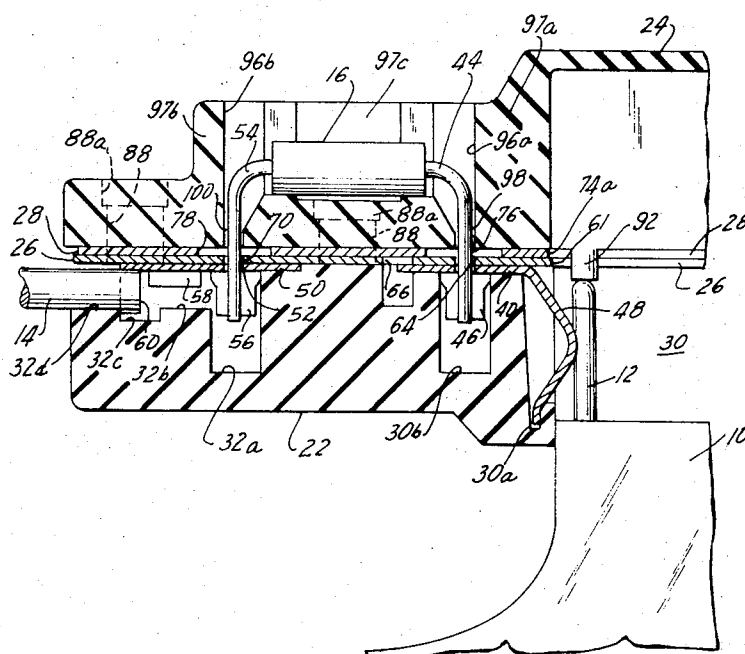
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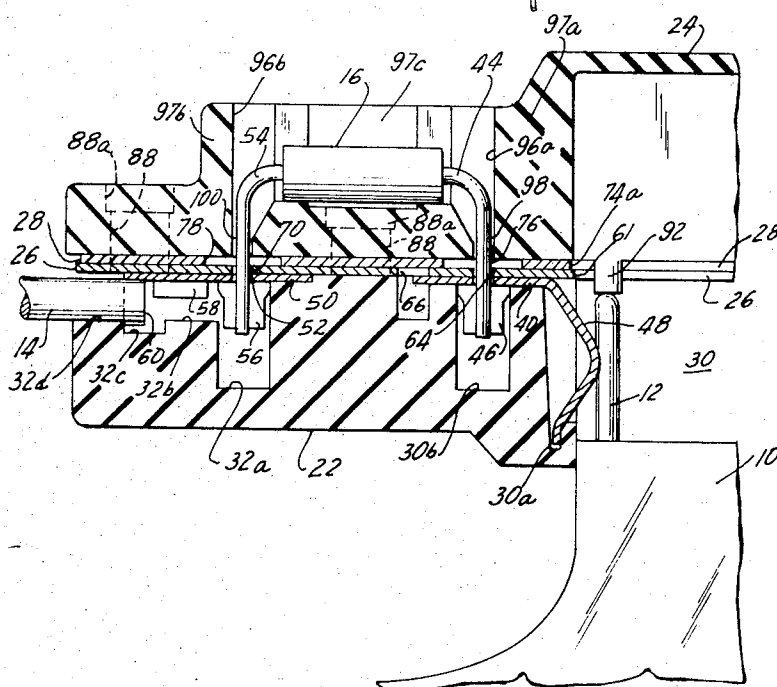
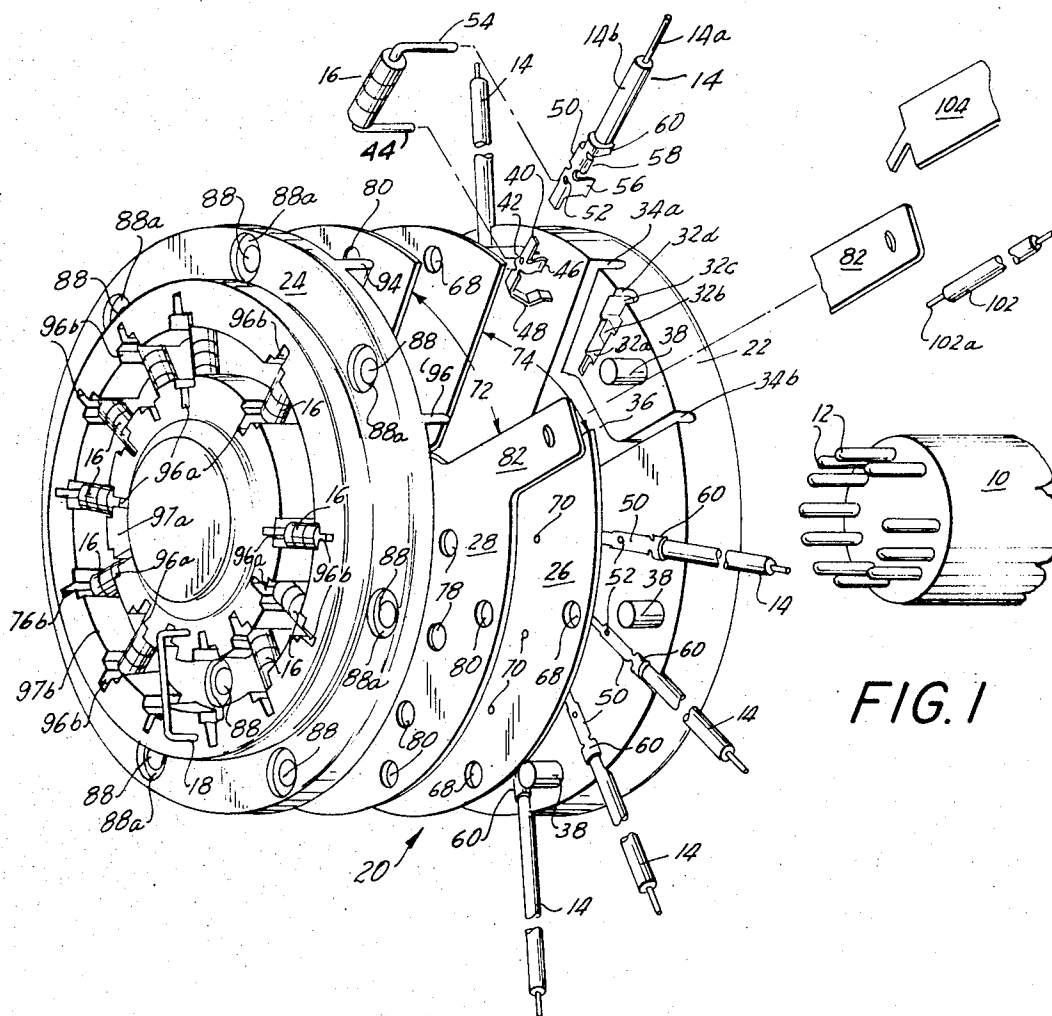
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ABSTRACT

A socket for a tube having pins comprises a receiving means for said pins and pin contacts adapted to engage the pins. Wire contacts are spaced from the pin contacts and are adapted to be connected to lead wires. Each of the contacts has a means for receiving a component lead so that components can be inserted between the pin and wire contacts. Therefore, each of the components will be in series between the lead wires and the electrodes of the tube.

34 Claims, 6 Drawing Figures





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FIG. 3

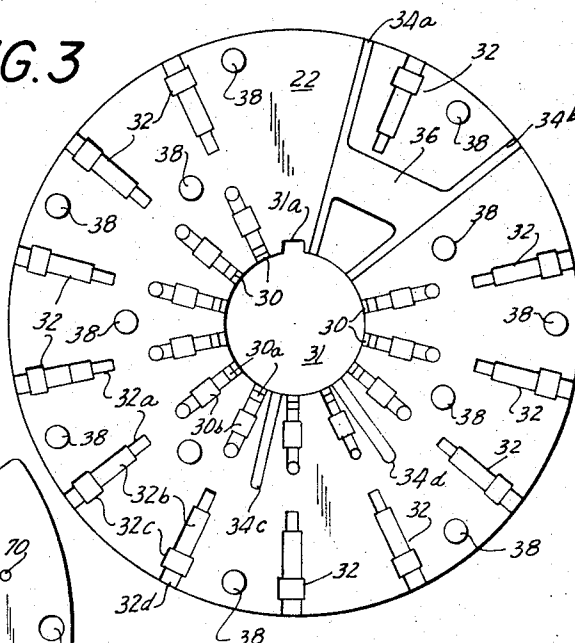


FIG. 4

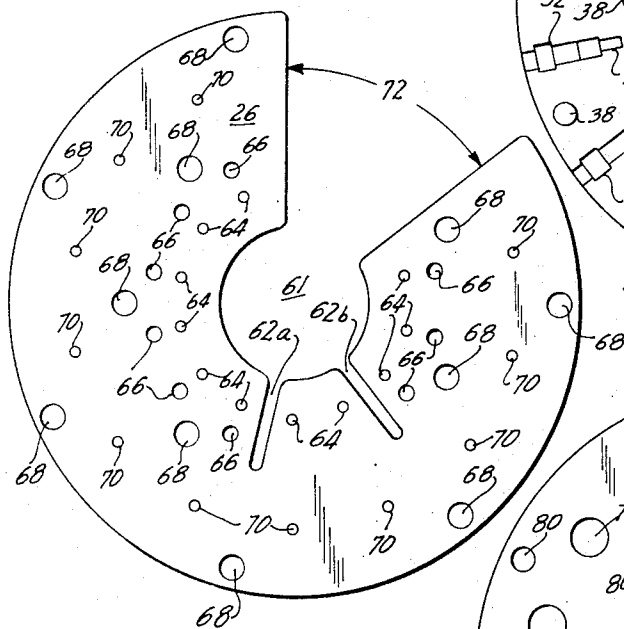


FIG. 5

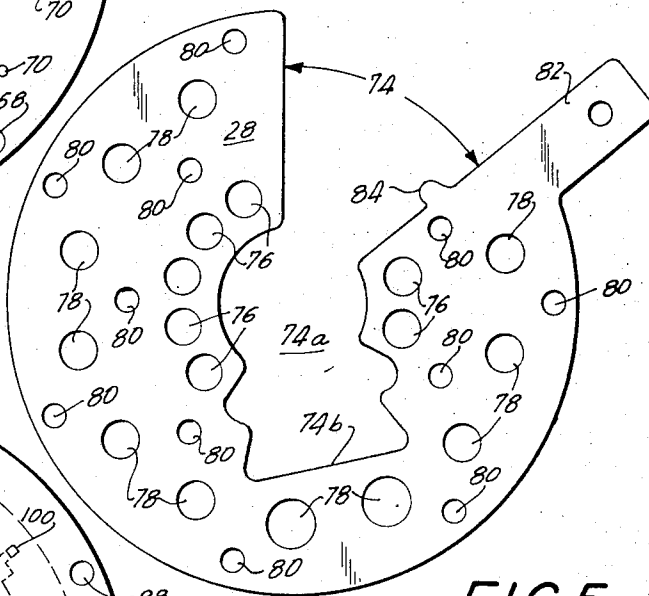
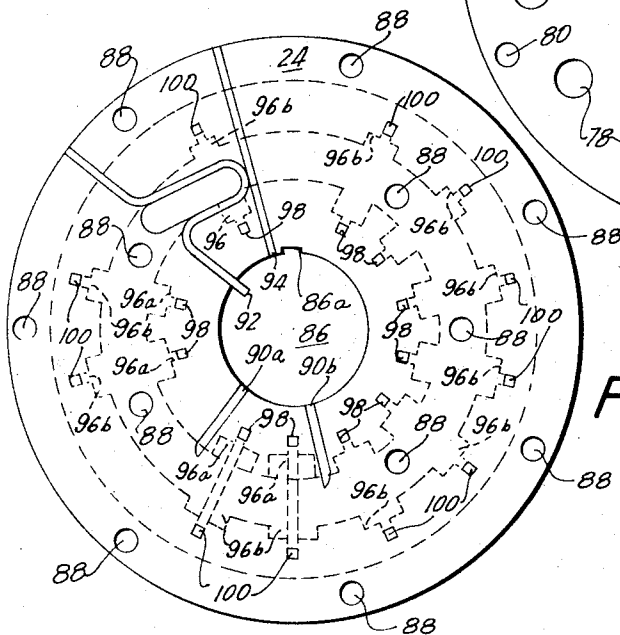


FIG. 6



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KINESCOPE TUBE SOCKET WITH COMPONENT RECEIVING MEANS

This invention relates to a socket for a kinescope and, more particularly, one that has provision for inserting components, such as resistors or shorting bars, in series between tube pins and external wire leads.

Kinescopes (picture tubes) are a common component of electronic systems where a visual display is required, such as television, radar, oscilloscopes, etc. In general, they comprise an electron gun for emitting electrons, a screen that emits light from a particular point when bombarded by the electrons at that point, a glass envelope enclosing the before-mentioned elements in a vacuum, and a deflection means for directing the emitted electrons to a selected point on the screen.

The kinescope envelope has a wide end where the screen is located, and a narrow end, called the neck. In order to make contact with most of the electrodes within the envelope, a plurality of pins are connected to said electrodes and project from within the envelope to its outside at the very end of the neck. A socket is connected to external lead wires, and it has a means for receiving the pins and contacts for connecting them to the respective lead wires. The lead wires in turn are connected to the external circuitry with which the kinescope operates.

Unfortunately, high voltage surges are a not unknown occurrence in the external circuitry. Such surges, if they occur in one of the parts of the circuit to which one of the leads is connected, will be applied by that lead to an electrode of the kinescope, and can do permanent damage. To protect the vulnerable electrodes, it is customary for the socket to have a grounded plate disposed near at least one of the contacts, so that a spark gap is provided between at least that one most vulnerable electrode and ground. When the voltage exceeds a predetermined value, the air in the spark gap breaks down, and the current resulting from the surge goes through the contact and the gap to the grounded plate, rather than through the kinescope electrode. In addition, the socket usually has a resistor connected in series between the electrode and the wire that connects the electrode to its appropriate circuitry. This limits the current that results from the surges, and therefore provides additional protection to the kinescope electrodes.

A typical prior art socket with the above-described protection devices typically comprises pin and wire contacts, resistors permanently affixed to the contacts, and a ground plate, all encased within a housing. When one of the resistors fails, due to a high voltage surge or for other reasons, the television serviceman must take apart the entire housing with special tools to replace the failed resistor. Since the contacts are permanently secured to the resistor, it is necessary to replace them and the wire lead as well. Because the repair usually takes place in the field, the repair may not be done entirely in a proper manner, and the performance of the entire socket can be adversely affected. Also, because of the encasing, visual examination of the resistors without taking apart the socket to determine if the proper value of resistance is being used is impossible.

It is therefore an object of my invention to simplify the construction and repair of a kinescope socket with built-in kinescope protection against high voltage surges.

It is another object to eliminate the necessity to disassemble such a socket to make repairs.

It is a further object to eliminate the necessity of using special tools to repair such a socket.

It is still another object to provide a socket that allows a quick visual observation to determine if the proper resistance value is being used.

It is yet a further object to provide a standardized socket construction which can be used in different circuits having different requirements for protective resistors and the like.

SUMMARY

In brief, these and other objects are achieved by having a kinescope socket that has provision for releasably securing at least one series component between pin and wire contacts. The component can be a resistor that limits the tube electrode current due to high voltage surges. To that end the socket comprises a body having a means for receiving the tube pins, pin and wire contacts disposed on said body, and means on each of said contacts for receiving component leads and spaced from one another by the distance related to the spacing of the leads of a component to be used. Where no components are to be connected to a given tube pin, a shorting bar is inserted between the corresponding pin and wire contacts.

Preferably, the body comprises disc-shaped cover and base elements, each having a central hold for receiving the tube pins. Therefore, the base and cover can be simply made by a molding process. The components are disposed externally of the cover, where they are easily accessible for inspection and repair and can readily be replaced when the socket is used with different circuits requiring different protective resistors. They are however housed within the cover for protective and safety purposes. The component lead receiving means preferably comprise gripping fingers and holes disposed in said contacts.

The preferred embodiment of said socket further comprises an insulating spacer and a ground plate disposed between said base and said cover, each having alignable component lead holes. Said spacer further comprises a voltage breakdown hold aligned with respect to said pin contact, whereby a spark gap is formed between said pin contact and said ground plate. Accordingly, if a high voltage surge occurs, current will flow from said pin contact through said hole to the plate, thereby affording additional surge protection to the tube elements.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to a kinescope socket as defined in the appended claims and as described in this specification, taken in conjunction with the accompanying drawings in which:

FIG. 1 is an exploded three-quarter perspective view of the socket in accordance with the invention;

FIG. 2 is a fragmentary view in cross-section taken through a typical resistor of one-half of the socket when completely assembled and disposed on the tube;

FIGS. 3, 4, and 5 are top views of the base, the insulating spacer, and the ground plate respectively; and FIG. 6 is a bottom view of the cover.

FIG. 1 shows a kinescope tube 10 having pins 12 to which wires 14 are to be connected. Certain tube elec-

trodes require high voltage protection, and hence resistors 16 are connected between pins 12 and wires 14. For other electrodes no protection is necessary, and therefore shorting bars 18 are used. This is done by means of a socket, generally designated 20, which comprises a disc-shaped insulating base 22 and a disc-shaped insulating cover 24. Both can be readily molded of insulating material, and hence have a low production cost. Base 22 receives pin contacts 40 that are respectively connected to pins 12, and wire contacts 50 that respectively engage the wires 14. Each of the contacts 40 and 50 have component lead receiving holes 42 and 52 respectively so that shorting bar 18 and leads 44 and 54 of resistors 16 can be inserted through component lead holes 98 and 100 (FIG. 2) in cover 24 into the component lead holes 42 and 52 in the contacts 40 and 50 to be electrically connected in series between the respective wires 14 and tube pins 12. Preferably, the socket further comprises an insulating spacer 26 with appropriate component lead holes 64 and 70 and also air gap holes 66, and a grounded plate 28 also with component lead holes 76 and 78. Spacer 26 and plate 28 are disposed between base 22 and cover 24 so that a spark gap is defined from the ground plate through said air gap holes 66 to the tube pin contacts 40. Thus, if a high voltage surge occurs, air in the air gap holes can break down from the tube pin contact 40 to the ground plate 28, thereby protecting the tube elements.

In detail, FIGS. 1 and 2 show that each of the tube pin contacts 40 has a component lead hole 42 for receiving the first lead 44 of resistor 16. A pair of opposing component lead gripping fingers 46 is disposed beneath hole 42 to resiliently and frictionally engage lead 44 when it is in place through hole 42 to ensure that it makes a good electrical connection with contact 40. A resilient bent portion 48 is located at the radially inner end of contact 40 so that it can engage one of the pins 12. Each of the wire contacts 50 has a lead hole 52 for receiving the other lead 54 of resistor 16. A pair of component lead gripping fingers 56 is disposed beneath hole 52 to likewise resiliently and frictionally engage the other lead 54. Wire contact 50 also comprises a section 58 adapted to be crimped into engagement with inner conductor 14a of wire 14 to make electrical contact therewith. Likewise, contact 50 comprises a section 60 adapted to be crimped into engagement with insulation sheet 14b of said wire 14 to make mechanical contact therewith. The mechanical connection helps relieve stress on the wire. From the above discussion, it will be seen that contacts 40 and 50 can be easily made by bending, stamping, and drilling inexpensive sheet metal.

FIG. 3 shows that base 22 comprises a disc-shaped element having a circular central hole 31 that has a key slot 31a. Hole 31 receives the tube pins 12, while key slot 31a receives a spline on the tube 10 to ensure that pins 12 are properly aligned with base 22 and hence pin contacts 40. Inner radially extending slots 30 are disposed about central hole 31 to receive pin contacts 40. They have deep depressions 30a communicating with central hole 31 for holding the bent portions 48 of the contacts 40 in a biased condition so as to resiliently engage tube pins 12, and radially outer depressions 30b for receiving component lead 44. They also receive the gripping fingers 46 of the contacts 40 in an interference

fit, so that the pin contacts 40 are snugly secured into base 22.

Outer radially extending slots 32 are disposed just within the outer circumference of base 22 and comprise a deep radially inner depression 32a for a receiving component lead 54. They also receive gripping fingers 56 of the contacts 50 in an interference fit to snugly secure wire contact 50 to base 22. Outer slots 32 also comprise an intermediate section 32b to receive wire crimps 58, and a shallow depression 32c that receives and outwardly radially abuts the insulation crimp 60 so as to provide strain relief thereto if an extraneous force is applied to wire 14. Finally, a channel 32d is provided that communicates with the space around socket 20 so as to be able to snugly receive the wire 14 to provide added strain relief.

Base 22 further comprises voltage barrier grooves 34a, 34b, 34c, and 34d that receive projections from cover 24 that will be described below in more detail so as to form voltage barriers around selected contacts. In particular, grooves 34a and 34b are disposed on either side of the focus electrode pin and wire contacts, while grooves 34c and 34d are disposed on either side of the filament electrodes pin contacts when the socket 20 is assembled. A pocket groove 36 transversely extends between grooves 34a and 34b to form a spark gap as will more fully be explained below. Posts 38 axially project upward from base 22 and are used to secure all of the elements of the socket 20 together.

As may best be seen in FIG. 4, the insulating spacer 26 has a central hole 61, radially extending voltage barrier slots 62a and 62b that communicate with central hole 61 and receive voltage barriers, inner component lead holes 64 disposed at equal distances from the center of hole 61 to receive leads 44, air gap holes 66 that with other elements form spark gaps, securing holes 68 for receiving the posts 38, and outer component lead holes 70 disposed at equal distances from the center of hole 61 for receiving leads 54. The walls defining an angular gap 72 will, when assembled, be positioned around the focus electrode contacts.

As may best be seen in FIG. 5, ground plate 28 has an angular gap 74 defined by walls that will straddle the focus electrode contacts when the socket is assembled, large inner 76 and large outer 78 component lead holes for receiving component leads 44 and 54, respectively, without contacting them, and securing post receiving holes 80. Communicating with angular gap 74 is a central hole 74a and an irregular opening 74b for receiving barrier projections. Ground plate 28 also comprises an outwardly radially extending ground lug 82 adapted to be connected to an external wire, so that plate 28 can be grounded, and a projection 84 that projects into gap 79 to form a spark gap with the focus electrode pin contact when the socket 20 is assembled.

As may best be seen in FIG. 6, the inner side of cover 24 has a central hole 86 that in turn has a key slot 86a for receiving the tube spline. The cover 24 also comprises holes 88 for receiving the posts 38, filament electrodes voltage barriers 90a and 90b that are received by base grooves 34d and 34c respectively, and focus electrode voltage barriers 92 and 94 that are received by base grooves 34b and 34a respectively. It should be noted that barrier 92 is serpentine-shaped to partially enclose the focus electrode and projects radially down

and into central hole 86 for a reason that will be explained below. FIG. 2 shows that post receiving holes 88 have recess 88a so that the posts 38 can be deformed to form a rivet without projecting above cover 24. Component lead holes 98 and 100 extend through to the outside of cover 24 for receiving the component leads 44 and 54 respectively. As best shown in FIG. 1, the outside of cover 24 has circular walls 97a and 97b that define an annular groove 97c. Walls 97a and 97b have radially extending slots 96a and 96b whose inner and outer ends coincide with lead holes 98 and 100 respectively. Slots 96a and 96b are adapted to snugly receive the two ends of a resistor 16 and hold it firmly in place without covering up its markings, so that a service man can readily determine the values of each of the resistors without disassembling the socket 20. Annular groove 97c permits the insertion of a tool, such as a screwdriver, under the resistors 16 so that, if they burn out, they can easily be pried loose, also without disassembly of socket 20.

To assemble the socket as shown in FIG. 2, the pin contacts 40 are inserted into inner slots 30 so that their gripping fingers 46 are in depressions 30b in an interfering fit and their resilient bent portions 48 are held and resiliently biased by depressions 30a. Sections 58 of wire contacts 50 are then crimped about the bared center conductors 14a of wires 14, and then likewise, sections 60 are crimped about the insulation sheath 14b. Wire contacts 50 are inserted into outer slots 32 with gripping fingers 56 in an interference fit in depressions 32a, crimped wire engaging sections 58 in intermediate section 32b, and the crimped insulation-engaging sections 60 radially outwardly abutting the outer walls of depressions 32c so that strain relief is afforded the wires 14.

Spacer 26 is placed over the base 22 and contacts 40 and 50 by aligning its post receiving holes 68 with posts 32 so that they project therethrough. This automatically aligns the spacer inner and outer component lead holes 64 and 70 with base lead depressions 30b and 30a respectively, and therefore, spacer voltage barrier grooves 62a and 62b are aligned with base grooves 34c and 34d, and the edges defining angular gap 72 straddle the base grooves 34a and 34b. It will be noted in FIG. 2 that the radially outer edges of at least some of the pin contacts 40 are directly below the air gap holes 66.

Then ground plate 28 is placed on top of spacer 26 by aligning its post receiving holes with posts 32 so that they project therethrough. This aligns its inner and outer lead holes 76 and 78 with spacer inner and outer lead holes 64 and 70 respectively, and therefore, the edges defining angular gap 74 straddle base barrier grooves 34a and 34b. Element 84 projects into pocket 36 to form a spark gap with the focus pin contact, which is disposed at the other end of pocket 36. Since ground plate 28 has no voids above the spacer air gap holes 66, a spark gap is also formed between it and the outer edges of most of the pin contacts 40, as shown in FIG. 2.

Cover 24 is then placed on top of ground plate 28 with its post receiving holes 88 aligned with posts 38 so that they project therethrough. Its inner and outer lead holes 98, 100 are therefore aligned with inner and outer plate lead holes 76, 78 respectively, and thus the other lead holes below them. Its barrier projections

90a, 90b project through irregular opening 74b and then slots 62b and 62a respectively to be received by base grooves 34d, 34c respectively, and thus form voltage barriers on either side of the filament pin contacts. Similarly, barriers 92, 94 project through plate and spacer angular gaps 74 and 72 to be received by grooves 34b and 34a respectively, except that the curved part of serpentine barrier 92 is received by pocket 36, and its radially inner end projects through plate and spacer central holes 74a, 61 down into base central hole 30. Then the tops of posts 38 are deformed by hot or cold working so that rivet tops in depressions 88a are formed, thereby securing all the layers 22, 24, 26, and 28, and contacts 40 and 50 of socket 20 together. This completes the assembly of the socket 20 proper.

As shown in FIG. 2, either the resistors 16 or shorting bars 18 are placed into the component slots 96a and 96b with their leads 54 and 44 penetrating the appropriate component lead holes 100 and 98 to frictionally engage the gripping fingers 56 and 46 respectively. The components 16 and 18 will then be housed within the slots 96a and 96b, and thus protected from any possible extraneous force that may tend to dislodge them from socket 20. The choice as to whether a resistor 16 or a shorting bar 18 is to be used for a particular slot depends upon whether the electrode to which the respective pin contact 40 is electrically connected needs protection against high voltage surges.

To connect the tube 10, it is plugged into the socket 20 until one of the pins 12 axially abuts serpentine barrier 92. Therefore, the barrier 92 determines the depth of penetration of the base of tube 10 into the socket 20. In this position the bent portions 48 of contacts 40 resiliently engage the tube pins 12, thus ensuring good electrical contact between pins 12 and pin contacts 40. Finally, as shown in FIG. 1, the grounding tab 82 is connected to either the center conductor 102a of a grounding wire 102 or a ground strap 104.

In operation, the power and signal currents going to the tube 10 will come in from the wires 14 to the wire contacts 50, then go through either the resistors 16 or shorting bars 18, and then to the pin contacts 40 through the pins 12 to the various electrodes of tube 10. If, however, a high voltage surge above a potential that is predetermined essentially by the thickness of spacer 26 occurs, the air in air gap holes 66 will break down and current will flow from the outer edge of the pin contacts 40 through the air gap holes 66 of spacer 26, to ground plate 28. If they are in series with the particular electrode that breaks down, the resistors 16 will limit the resultant breakdown current. If a high voltage surge above a potential that is determined by the distance between the focus pin contact and projection 84 occurs, the air in pocket 36 will break down, and current will go from focus pin contact through the transverse air pocket 36 to the projection 84. Voltage barriers 90a and b protect the filament electrode pin contacts from the high voltages on the other elements.

If one of the resistors 16 burns out due to a high current flowing therethrough, then the identification of that resistor can be easily made by inspecting the rear of the socket 20. That resistor can then be simply replaced by removing it from the socket by using a screwdriver without using special tools, and then insert-

ing a new resistor having the proper resistance value. Obviously, no disassembly of the socket 20 is required as with prior art sockets, and it can even remain plugged onto the tube 10, provided the power in the external circuits is turned off.

It will be appreciated that the socket of the present invention provides high voltage surge protection for the electrodes of a kinescope by use of spark gaps and current limiting resistors. Determination that resistors of the correct values are being used can readily be made by a simple inspection of the rear of the socket. Burned out resistors can easily be replaced by using ordinary tools such as a screwdriver and without taking apart the socket or even removing it from the tube. If the socket is to be used with different circuits, then likewise different values of resistors can be readily inserted into the appropriate component slots without disassembling the entire socket. The socket is inexpensively made by molding insulating material and bending and cutting conducting sheet metal.

Although the present invention has been disclosed with respect to a single embodiment, it is to be understood that many variations may be made therein, all without departing from the spirit and scope of the invention as defined in the following claims.

I claim:

1. A socket for a tube having pins, said socket comprising a disc-like body having means for receiving the said pins; at least one pin contact means on said body for engaging tube pins when said tube is inserted into said socket; at least one wire contact means disposed on said body generally radially outwardly relative to and spaced from said pin contact means for connecting to a lead wire; means on each of said contact means for receiving component leads and spaced from one another by a given distance; whereby the leads of a selected component having a lead spacing corresponding generally to said given distance can be inserted into said component lead receiving means, thereby to be electrically connected in series with said pin and said lead wire.

2. A socket as claimed in claim 1, designed to be used with an insulated wire and wherein said wire contact means further comprises a means for securing the insulation of said wire to said wire contact, and said body has a depression disposed generally radially outwardly from said wire contact means which receives and radially abuts said securing means, whereby strain relief is afforded said wire.

3. A socket as claimed in claim 1, wherein said pin contact means further comprises a resilient bent portion means for engaging one of said pins and said body has a depression in which said bent portion means is received in a biased position.

4. A socket as claimed in claim 1, wherein said body comprises a first means for receiving said component and a second means operatively connected to said first means for receiving said contacts, one of said means having at least one member projecting therefrom toward the other of said means between adjacent contacts, said other of said means having at least one groove in which said projecting member is received; whereby a voltage barrier is formed between adjacent contacts.

5. A socket as claimed in claim 1, wherein said body comprises a first means for receiving said component and a second means operatively connected to said first means for receiving said contacts and wherein said pin receiving means comprises said second means having a central hole, one of said first and second means having a projecting member projecting into said central hole, whereby one of said pins will abut said projection when said tube is inserted, thereby determining the insertion depth of said tube into said socket.

6. A socket as claimed in claim 1, wherein said body comprises a first means for receiving said component, and a second means operatively connected to said first means for receiving said contact, and further comprising an insulating spacer disposed between said first and second means, said spacer having at least two component lead holes aligned with said pin and wire contact lead receiving means respectively and being adapted to receive said component leads, said spacer further comprising a voltage breakdown hole aligned with one of said contacts; and a grounded plate disposed between said spacer and said first element and having two component lead holes aligned with said spacer component lead holes and being adapted to permit said component leads to pass through said plate; whereby if the voltage applied to said one of said contacts exceeds a predetermined value a breakdown circuit will be established from said one contact through said breakdown hole to said ground plate.

7. A socket as claimed in claim 1, wherein each of said lead receiving means comprises a pair of resilient opposing component lead gripping fingers adapted to resiliently engage said component lead.

8. A socket as claimed in claim 5 wherein said breakdown hole is aligned with respect to said pin contact.

9. A socket as claimed in claim 1, wherein said component comprises a resistor having two leads inserted into said respective component lead receiving means.

10. A socket as claimed in claim 1, wherein said component comprises a shorting bar having two leads inserted into said respective component lead receiving means.

11. A socket as claimed in claim 1, wherein said body is adapted to frictionally receive each of said contacts.

12. A socket for a tube having pins, said socket comprising a base element having means for receiving the pins; at least one pin contact means disposed on said base for engaging one of said pins when said tube is inserted into said socket; at least one wire contact means disposed on said base spaced from said pin contact means for connecting to a lead wire; means on each of said contact means for receiving component leads and being spaced from one another by a given distance; a cover element including means for receiving said component leads and being operatively connected to said base with said component lead receiving means aligned with said lead receiving means on said contact means; whereby the leads of a selected component can be inserted through said cover element means into said component lead receiving means, thereby to be electrically connected in series with said pin and said lead wire.

13. A socket as claimed in claim 12, further comprising an insulating spacer disposed between said base element and said cover element, said spacer having at least two component lead holes aligned with said pin

and wire contact lead receiving means respectively and being adapted to receive said component leads, said spacer further comprising a voltage breakdown hole aligned with one of said contacts; and a grounded plate disposed between said spacer and said cover and having two component lead holes aligned with said spacer component lead holes and being adapted to permit said component leads to pass through said plate; whereby if the voltage applied to said one of said contacts exceeds a predetermined value a circuit will be established from said contact through said breakdown hole to said ground plate.

14. A socket as claimed in claim 13, wherein said breakdown hole is aligned with respect to said pin contact.

15. A socket as claimed in claim 12, wherein said component comprises a resistor having two leads inserted into said respective component lead receiving means.

16. A socket as claimed in claim 12, wherein said component comprises a shorting bar having two leads inserted into said respective component lead receiving means.

17. A socket as claimed in claim 12, wherein each of said lead receiving means comprises a pair of resilient opposing component lead gripping finger means for resiliently engaging said component lead.

18. A socket as claimed in claim 12, wherein said wire comprises an insulated wire and wherein said wire contact means further comprises a means for securing the insulation of said wire to said wire contact means, and said body has a depression disposed generally radially outwardly from said wire contact means, said insulation securing means being received in and radially abutting said depression, whereby strain relief is afforded said wire.

19. A socket as claimed in claim 12, wherein said pin contact means further comprises a resilient bent portion adapted to engage one of said pins and said body has a depression in which said bent portion is received in a biased position.

20. A socket as claimed in claim 12, wherein one of said base and cover elements further comprises at least one member projecting therefrom toward the other said element between adjacent contacts, said other element having at least one groove for receiving said projecting member; whereby a voltage barrier is formed between said adjacent contacts.

21. A socket as claimed in claim 12, wherein said pin receiving means comprises said base element having a central hole, one of said base and cover elements having a projecting member projecting into said central hole, whereby one of said pins will abut said projection when said tube is inserted, thereby determining the insertion depth of said tube into said socket.

22. A socket for a tube having pins, said socket comprising a body having means for receiving the pins; at least one pin contact means housed within the body for engaging one of said pins when said tube is inserted into said socket; at least one wire contact means housed within said body for connecting to a lead wire; means on each of said contact means for receiving component leads and being spaced from one another by a given distance; said body having openings aligned with said component lead receiving means and communicating

with the outer surface of said body; whereby the leads of a selected component having a lead spacing generally corresponding to said given distance can be inserted through said openings to be engaged by said lead receiving means, thereby to be electrically connected in series with said pin and said lead wire and to be readily inspectable and replaceable.

23. A socket as claimed in claim 22, wherein said body further comprises at least one recess means disposed on its outer surface proximate said openings for receiving said component, whereby said component is protectively housed.

24. A socket as claimed in claim 22, wherein said pin, contact means further comprises a resilient bent portion adapted to engage one of said pins and said body has a depression in which said bent portion is received in a biased position.

25. A socket as claimed in claim 22, wherein said body comprises a first means for receiving said component and a second means operatively connected to said first means for receiving said contacts, one of said first and second means having at least one member projecting therefrom towards the other of said means between adjacent contacts, said other of said means having at least one groove for receiving said projecting member; whereby a voltage barrier is formed between said adjacent contacts.

26. A socket as claimed in claim 22, wherein said body comprises a first means for receiving said component and a second means operatively connected to said first means for receiving said contacts and wherein said pin receiving means comprises said second means having a central hole, one of said first and second means having a projecting member projecting into said central hole, whereby one of said pins will abut said projection when said tube is inserted, thereby determining the insertion depth of said tube into said socket.

27. A socket as claimed in claim 22, wherein said body comprises a first means for receiving said component, and a second means for receiving said contacts, and further comprising an insulating spacer disposed between said first and second means, said spacer having at least two component lead holes aligned with said pin and wire contact lead receiving means respectively and being adapted to receive said component leads, said spacer further comprising a voltage breakdown hole aligned with one of said contacts; and a grounded plate disposed between said spacer and said first element and having two component lead holes aligned with said spacer component lead holes and being adapted to permit said component leads to pass through said plate; whereby if the voltage applied to said one of said contact exceeds a predetermined value a breakdown circuit will be established from said one contact through said breakdown hole to said ground plate.

28. A socket as claimed in claim 22, wherein said body further comprises a groove disposed on its exterior between said openings; whereby said component can be readily removed from said component lead receiving means and said body.

29. A socket as claimed in claim 22, wherein each of said lead receiving means comprises a pair of resilient opposing component lead gripping fingers adapted to resiliently engage said component lead.

30. A socket as claimed in claim 22, wherein said wire comprises an insulated wire and wherein said wire contact means further comprises a means for securing the insulation of said wire to said wire contact means, and said body has a depression disposed generally radially outwardly from said wire contact means and adapted to receive and radially abut said securing insulation means, whereby strain relief is afforded said wire.

31. A socket as claimed in claim 27 wherein said breakdown hole is aligned with respect to said pin contact.

32. A socket as claimed in claim 22, wherein said component comprises a resistor having two leads inserted into said respective component lead receiving means.

33. A socket as claimed in claim 22, wherein said component comprises a shorting bar having two leads inserted into said respective component lead receiving means.

34. A socket as claimed in claim 22, wherein said body is adapted to frictionally receive each of said contacts.

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